Methods in Active Inquiry Based Learning toward Motivation and Engagement

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Introduction

Education professionals are always looking for the methods to engage students in effective and exciting learning. This has led to the development of many variations on student centered learning: project-based, problem-based, challenge-based, game-based, and gamification. It is unclear which of the many varieties of active learning are the most effective or if there are aspects that each method shares with the others that makes them more enticing to students, and thus more motivating and engaging.

My work at Paragon Space Systems and Ventana Medical Systems showed me how real engineers and scientists do their jobs. I gained perspective from two different companies while working in a variety of jobs in each. Although there are big differences in the industries, the principles I gained are very similar.

People actively perform work whether using a computer to draw a schematic or physically building a part, there is an active component to what employees, engineers, scientists, and technicians are doing. Although work isn't always physical, it is always dynamic. Having pre-set answers is rare. Having to figure out the answers and finding solutions are much more common place. And even when someone has an answer, individuals work to understand if it is the best possible answer. Employees are constantly pushing themselves to improve. These insights pushed me to find ways to engage students in active learning.

Findings

Students liked projects that were hands-on, relevant, and included problem solving. The method of teaching, such as problem-based, mattered more than the topic being taught, like environmental engineering. Overall, no one method was better at engaging students – the elements that they had in common were the effective aspects of engagement.

Students who completed the courses were not only positive about their projects, but were more motivated in the content basis for the projects. When compared to each other, students seemed to enjoy the projects equally. In addition, by the end of the year, students also seemed more likely to want to go to college. Of the 105 students surveyed, 100 specifically said they wanted to go to college. Of those, 54 wanted to go into STEM careers. Students reported that they liked doing projects and building but did not like working with other people.

Plan of Action

Of the 21st Century Skills, collaboration is the most essential. In the future, I will need to emphasize the importance of group work and collaboration. I need to allow students to experience a variety of project methodologies. By allowing multiple types of projects, regardless of the topic, I will have greater flexibility to engage my students in exciting hands-on, relevant work. I will change my lessons to be less about specific processes and more about aspects that engage students to want to learn more about engineering and science. By doing so, the topics become more approachable and relevant to future work.